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ABSTRACT

The Outcome-Based Instructional Systems approach is a comprehensive design for teaching and learning and instructional management that has its roots in the mastery learning and competency-based education movements of the early 1970s and has been implemented in hundreds of schools and districts across the country. The first part of this brief explores the roots of the outcome-based strategy and describes how such a system operates. The second part of the brief features profiles of three outcome-based instructional programs: Center School, New Canaan, Connecticut; Johnson City Central School District, New York; and Red Bank Borough School District, New Jersey. These descriptions not only illustrate the variety of potential applications of outcome-based instruction but also suggest some of the implications of adopting this educational delivery strategy. (BW)

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EDUCATION BRIEF

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explicitly assess and validate student performance on the goals they have been teaching. The three curricular components of learning objectives, learning activities, and measurement of performance are aligned. A feedback/corrective process that is appropriate and timely is provided.

What does it take to successfully apply these principles of ML in a classroom--or in a school district? Block (1979) describes the following five teacher activities as characteristics of the ML approach:

1. Diagnosis refers to determining which cognitive or physical prerequisites students possess prior to their engaging in a learning activity. Learning time is often wasted by students who either cannot comprehend or already know the tasks they have been assigned to accomplish.

2. Prescription is the provision of appropriate learning tasks for each student based on the teacher's diagnosis. It implies that specific learning objectives have been identified and that the learning materials selected are congruent with the objective.

3. Orientation is the clarification of each learning task for each student in terms of what is to be learned and how it is to be learned. This means making the learning objective clear to students before they begin to address it and describing what successful performance would look like when the objective has been reached.

4. Feedback is the provision of constant information to each student regarding learning progress. This component requires that assessment and monitoring of student learning be continuous and tied directly to the successful accomplishment of the learning objective being addressed.

This feedback is especially important in that most ML strategies involve group instruction, and no matter how effective the teacher is there are always errors in learning from group instruction that need to be caught immediately before they are compounded with later learning errors. This feedback is usually in the form of brief diagnostic (or "formative") tests that indicate what each student has learned and what he or she still needs to learn before the learning task has been mastered. These are used at the end of each week or two of instruction.

5. Correction is the provision of timely supplementary instruction for each student whose learning progress is insufficient. Extended learning time and opportunity are helpful to some students only if they are shown their mistakes and are given additional instruction specifically targeted at correction. This additional instruction is not simply a repetition of the initial assignment but instead reflects an alternative approach to the objective.

The integration of these five components suggests some important implications for curriculum design, the teacher's instructional focus, the management of time and students, and expectations for student achievement and success. The ML experiments of the 1970s proved there were a variety of ways that this basic strategy could be successfully implemented. But there were also limitations. Educators who attempted to introduce well-conceived and comprehensive ML programs came up against some formidable institutional obstacles.

The four major obstacles to ML implementation as described by Spady and Mitchell (1977) are: (1) the attitudes and beliefs of staff regarding themselves and their students' performance; (2) the new techniques and redefinition of roles and responsibilities required of staff; (3) existing organizational structures and procedures; and (4) the system of power and incentives governing the conditions of staff service, performance, and influence. The first two obstacles are familiar and can be addressed by implementing staff development strategies that focus on changing teacher attitudes and skills. But the second two obstacles go beyond staff development and require new organizational structures and procedures.

To address all four obstacles, Rubin and Spady (1984) described a system of instructional delivery for the entire school which would enable students to

receive the benefits of "individualized Mastery Learning instruction" without compelling teachers to acquire and apply a new and complex repertoire of teaching, testing, and classroom management skills. This instructional model is one of three described in the second part of this Brief.

Outcome-Based Instructional Delivery

In an attempt tc bring philosophical and operational clarity to the many existing versions of ML and competency-based education and to look for ways to deal with all four obstacles listed above, a group of researchers and educators formed the Network for Outcome-Based Schools. In 1981, the Network's Executive Committee formalized the "Philosophical Premises Underlying Outcome-Based Practice" and the "Operational Essentials of Outcome-Based Practice." (see Tables I and II)

The premises and conditions of the outcome-based instructional system represent a fundamental shift in the nature of instructional management. They call into question those teaching, evaluation, and student assignment methods that stress comparisons among students. This system illustrates the limitations of a fixed-time, one-shot instructional delivery approach that assumes that those students who do not do well within the time allowed for their initial learning are inherently incapable of doing well at all. In an outcome-based system, student success is reflected in "goals reached" rather than "relative advantage" over other students' performance. Adjusting instructional delivery to accommodate the learning rates of individual students is one of the keys to the success of outcome-based programs. Reaching goals, at whatever point in a student's career it occurs, becomes the criterion for success and advancement;

TABLE I

Philosophical Premises Underlying Outcome-Based Practice

1. Almost all students are capable of achieving excellence in learning the essentials of formal schooling.
2. Success influences self-concept; self-concept influences learning and behavior.
3. The instructional process can be changed to improve learning.
4. Schools can maximize the learning conditions for all students by:
    a. establishing a school climate which continually affirms the worth and diversity of all students;
    b. specifying expected learning outcomes;
    c. expecting that all students perform at high levels of learning;
    d. ensuring that all students experience opportunities for personal success;
    e. varying the time for learning according to the needs of each student and the complexity of the task;
    f. having staff and students both take responsibility for successful learning outcomes;
    g. determining instructional assignment directly through continuous assessment of student learning; and
    h. certifying educational progress whenever demonstrated mastery is assessed and validated.

therefore, the traditional concepts of credit, evaluation, and promotion take on a new meaning which is linked directly to these goals and performance criteria. Credit is awarded whenever mastery occurs.

In this system, instructional delivery depends on the ready availability of criterion-referenced assessment data to teachers. These data, which directly relate to the learning goals, are used to make instructional assignment decisions on a day-to-day basis. This more flexible assessment-driven instructional model is what many educators feel is needed to address the institutional obstacles to successful implementation of an outcome-based instructional approach. To illustrate the differences between a traditional instructional system and the outcome-based instructional approach, Spady (1982) offers the framework of organizing variables in Figure 1.

TABLE II

Operational Essentials of Outcome-Based Schools

The following program components must be present in order to implement an authentic Outcome-Based learning system:

1. Publicly determined and stated learning outcomes for all students.
2. Derived from these learning outcomes, a criterion-referenced assessment system which documents, records, reports, and awards credit for student attainment.
3. Derived from these learning outcomes, objectives-based core and alternative curricula.
4. Derived from these learning objectives, a systematic process for planning and providing instruction appropriate to each student and for engaging the student until learning outcomes are attained. This systematic process includes:
   a. assessing current student skills/learning for instructional assignment;
   b. analyzing the content of each objective so that instructional strategies match assessment;
   c. when appropriate, sequencing tasks into a hierarchy of learning skills to maximize the effectiveness of instructional delivery;
   d. orienting students to the objective(s) to be learned;
   e. initial teaching to the objective(s) which provides varied approaches, adequate practice time, and multiple opportunities for learning and success;
   f. assessing student mastery of the objective(s) to determine the need for movement to a new instructional objective, extension/enrichment, or correctives;
   g. for those who attain mastery, progressing to the next objective or offering extension/enrichment; and
   h. for those who do not attain mastery, providing correctives, using different teaching strategies, until outcomes are attained.
5. A criterion-referenced information management system at the classroom and building levels for coordinating timely instructional planning, student assessment and placement, instructional delivery, and program evaluation.
6. An evaluation/certification system which allows students to demonstrate and receive credit for improved levels of performance at any time.
7. A program evaluation component which guides instructional planning by comparing the learning outcomes of program graduates with the performance demands of post-school roles.

CERTIFICATION/STANDARDS STRUCTURE (Goal System)	TIME/OPPORTUNITY STRUCTURE (Role System) FIXED/SINGLE (Role-Constrained)	FLEXIBLE/MULTIPLE (Role Flexible)
VAGUE REFERENCED/ VARIABLE, PRIVATE (Goal Implicit)	Traditional School Practice	Humanistic Developmental Approach
CRITERION REFERENCED FIXED, PUBLIC (Goal Directed)	Minimum Competency Testing Accountability	Mastery Learning/ Outcome-Based School Reform
	(Exclusionary Model)	(Inclusionary Model)

Figure 1. A Framework of Organizational Variables that Affect Instructional Operations

As suggested in Figure 1, the structure of the school's certification system establishes the philosophical and operational framework around which instructional delivery and student eligibility are defined and operate. The fixed time/single opportunity delivery system (left side of the figure) reserves success and advancement for those students who can meet whatever standards are set within the predetermined amount of time allowed. Those who cannot, "fail" and are excluded from immediate eligibility for advancement.

The model of opportunity represented on the right side of the figure is designed to keep access and eligibility open for those with any hope of success. This embodies the fundamental intent of outcome-based practice. Failure to address this organizational issue can undermine both the spirit and operational effectiveness of outcome-based practice.

What do these guidelines and models mean for the teacher or school administrator interested in planning and implementing an outcome-based approach in their school? How do these precepts translate into practice? We asked educators from three successful outcome-based schools or districts to describe their programs for us.

REFERENCES

Block, James H. "Mastery Learning: The Current State of the Craft." Educational Leadership, November 1979.

Bloom, Benjamin S. "An Introduction to Mastery Learning Theory." In J.H. Block, ed. Schools, Society, and Mastery Learning, New York: Holt, Rinehart and Winston, Inc., 1974.

Rubin, Stephen E. and William G. Spady. "Achieving Excellence through Outcome-Based Instructional Delivery." Educational Leadership, May 1984.

Spady, William G. "Outcome-Based Instructional Management: A Sociological Perspective." Australian Journal of Education, 26:2, 1982.

Spady, William G. and D.E. Mitchell. "Competency Based Education: Organizational Issues and Implications." Educational Researcher, 6(2), 1977.

PART TWO: PROFILES OF OUTCOME-BASED INSTRUCTIONAL SYSTEMS

CENTER SCHOOL
NEW CANAAN, CONNECTICUT

The Center School in New Canaan, Connecticut is a K-6 school with 16 classroom teachers and a heterogeneous population of 400 students from a generally middle class community. This program has evolved over an 18 year period.

Overview

The reading, writing, and math programs at Center School are all organized in a similar way. The math program will be described here. The math program organizes instructional groups according to two criteria:

(1) Everyone in an instructional group shares a common need to learn the same thing at the same time, and the group is formed around that specific skill, objective, or outcome.

(2) Everyone in an instructional group has already mastered the objective(s) that are prerequisite to learning this new objective.

Class members vary in age, ability, previous experience, socio-economic level, motivation, and the rate at which they are likely to learn the skill in question, but they are assigned to the same class because they all need to learn the same new task at this time. When that is no longer true--because someone learns the new task--that person is reassigned to a new class. Instruction based on this task-assignment grouping approach is highly focused and efficient since students in these groups are ready and able to learn the new objective and have already met the necessary prerequisites. Students work with each other and with their teacher in a social setting rather than by "individualized instructional packets." The restricted range of learning needs allows teachers to use a variety of instructional materials and methods. In this system the "gifted" student moves along quickly and the "learning disabled" student doesn't get pushed along in confusion; both groups learn within the same structure and the same system, albeit at different rates. Neither group is segregated or separated into a different program; there is no "remedial" instruction outside the regular program.

Operation of the System

1. Planning

   a. Setting objectives for units of instruction.

      The math objectives span a range from pre-kindergarten knowledge to what is considered the end of Algebra 1. Over a period of 18 years, 231 "packages" or clusters of objectives have been operationally defined and refined to cover this range of skills. Each package or "terminal objective" contains approximately 4 objectives, although packages vary from 1 to 8 objectives.

      Once the staff determined what objectives they wanted to include in the curriculum, they also recognized that these discrete objectives needed to occur in some sequence and that the sequence was not to be an arbitrary one. Some objectives were subordinate or dependent on others, and staff created a hierarchy of dependencies which could be graphically represented in the form of a hierarchical map. This map of the math curriculum is used both as a record of student progress and as a decision-making tool for student assignment.

b. How are classes formed? What grouping arrangements are used?

The hierarchy of objectives enables instructional managers to re-define the boundaries of instructional groups with continuous flexibility. Task assignment grouping arrangements are formed so that students who share the same instructional need at a particular time are brought together. In this grouping arrangement, the instructor can focus on a limited set of instructional needs without trying to deliver multiple types of instruction simultaneously. Since many students master the objective of the group within a few days or a week, grouping arrangements change frequently.

c. How are the staff assignments made?

The entire instructional staff, including specialty teachers, is engaged in math instruction for the same one hour period each day. This means that the complement of teachers available for math instruction is larger than the number of grade-level teachers, and that coordination can be concentrated on a fixed point during the day. Using the computer, the Program Coordinator can easily decide which new classes need to be formed and which teachers are likely to be available to conduct them. The assignments are worked out individually with teachers, some of whom prefer to concentrate on certain parts of the curriculum while others prefer variety. Since some objectives can be mastered by students in just a few days, some re-assignments are rather frequent. Teachers are not burdened with figuring out schedules and student assignments. This leaves them free to concentrate on teaching those students assigned to their class on any particular day.

2. Evaluating mastery

At Center School a student will leave an instructional group when he or she demonstrates mastery of the objective. Typically the teacher initiates this process when he or she feels that the student's classroom performance suggests that the objective has been mastered. Assessing competency occurs in a centralized Testing and Evaluation Center, apart from the instructional site. The Center is staffed by aides and frees teachers from this non-instructional (paper work) responsibility. The primary function of the instructional site is to provide instruction and to prepare students for competency. Testing in the Center also allows testing conditions to be held uniform.

Each student is evaluated on all elements in the instructional program. Nothing is evaluated or tested that is not a part of the curriculum. The program has developed 231 test instruments or procedures to evaluate the 231 terminal objectives included in the curriculum.

There are certain performance objectives in every program that cannot adequately be measured by paper and pencil tests. When measuring a student's ability to perform or do something physically, the Center School staff use a criterion rating scale which enables different raters (teachers) both to observe and to assess the performance in a similar manner. This ensures the reliability or consistency of measurement.

3. Prescribing correctives, use of gap time, "moving on" to new objectives.

As the student demonstrates competency on a specific objective, a circle representing that objective is "colored in" on the student's hierarchy map. By changing colors from grade to grade, staff can easily identify when particular knowledge is developed. Therefore, it is entirely possible to graphically record and chronologically trace the development of a student's mathematical knowledge from kindergarten through high school algebra on one piece of paper.

There is no "gap" time. The flow is continuous. When the student demonstrates mastery of a new objective at the Testing and Evaluation Center, the Program Coordinator selects a new and appropriate objective from among the range of learning options presented by the classes currently operating. In order to do this, the Coordinator must know exactly what each teacher is presently teaching, must avoid

assigning the student to a class that is working on an objective that the student has already mastered, and must not place the student in a class for which he or she lacks the prerequisites.

Typically, a student will be eligible to start learning ten to fifteen different objectives at any given time, but since a learner can master only one objective at a time, the Coordinator identifies one appropriate option that the present schedule accommodates. Making decisions that will best facilitate the student's progress through the hierarchy requires some experience as well as a basic understanding of the curriculum's critical paths.

Before the student sets off to master the new objective, he or she will be pre-tested to re-assess whether or not the knowledge necessary for mastery has been retained. This precaution takes into consideration the fact that the student may have forgotten some of the prerequisite knowledge. If so, the student then has the opportunity to review and reinforce past learning experiences at the Instructional Resource Center.

4. Recordkeeping

Computer software was developed to help simplify all aspects of student recordkeeping and program coordination. The software contains the entire hierarchy of 231 objectives and has the capacity to keep detailed records of each student's performance profile, including the date the student began working on each objective, the date the objective was completed, the date(s) of testing for the objective, the test score, the name of the teacher who taught the objective, a qualitative assessment of the student's work for that time period, the objectives for which the student is now eligible, and the prerequisite tests which the student must pass before beginning a new objective.

The Program Coordinator knows which students are eligible for particular objectives and can adjust teacher assignments accordingly. The data bank also maintains an up-to-date compostite list of all students in each grade level, rank ordered and divided into quartiles according to the number of objectives each has accomplished. It automatically flags any student who has been working on an objective longer than an expected number of days. This alerts staff that some students may be falling behind on a day-to-day basis and may need special assistance.

Results

Data taken from the school's math program from each of the past 6 years indicate that this delivery strategy enables all students to advance through the curriculum as rapidly as their aptitudes allow, with the following results:

1. Between 10 and 20% of the sixth graders each year completed the equivalent of the first half of Algebra 1, and many of these completed the entire course.

2. No more than 1 or 2 students per year in the entire school failed to reach grade level on standardized mathematics tests.

3. In 1981, over half of the sixth graders and over one quarter of the fifth graders scored 12.9 (or 99th percentile) on the Metropolitan Achievement Test in Mathematics; 6.3 was the lowest score recorded by a sixth grader, and 5.9 was the lowest for any fifth grader.

4. Based on the 1981 sixth graders' IQ's, their predicted quartile break scores on the Metropolitan were 5.9, 7.0, and 7.9, but their actual achievements were 9.1, 12.9, and 12.9 respectively;

5. By March 21, 1983 almost 20 percent of the sixth graders were working on Algebra 1 content and another 36 percent were working on Integers and Order of Operations objectives found in typical pre-algebra texts.

Implications for Implementation

- There are many options for student assignment. If one student/teacher combination is not working out, there are many others.
- The Coordinator, who specializes in a particular curriculum area, is a valuable resource to meet with parents and students and to act as a trouble shooter.
- There is a significant reduction in textbook expenditures.
- It offers the opportunity to utilize staff with maximum efficiency.
- The instruction is differentiated so as to provide for gifted as well as L.D. kids.

1. Benefits of this system

   a. Greater freedom to teach. Teachers have the opportunity to focus their attention on teaching and to experience on a frequent basis the tangible results of their efforts. Since the program prescribes no particular text or technique for instruction, teachers are free to use their professional judgment and experience in planning and executing lessons. A collection of materials for each objective is available in the Instructional Resource Center for teacher use and modification. Teachers are also relieved of the constant pressures of testing, recordkeeping, review, and conferencing.

   b. Shared accountability. All students are eligible to learn from any teacher, and accountability is shared by the entire staff. The system as a whole takes responsibility for student and program success, and there is no attempt to fix accountability on any given teacher. Teachers don't have to defend their actions and student-teacher conflicts are minimized.

   c. Increased staff morale and cohesion. The Center School model enables teachers to develop an authentic community of professionals. Because the system requires the cooperation, flexibility, effort, and communication of all participants, there is a premium on addressing and solving problems when they arise. There is a great deal of instruction-related interaction among the staff, and this brings with it a high degree of peer regulation and feedback. This reduces the need for administrative intervention. The success of the program reinforces the teachers' sense of success and efficacy.

   d. Differentiated leadership opportunities. Center School teachers have the opportunity to perform a variety of tasks during the year since the system creates the need for differentiated roles and responsibilities. Teachers can spend at least part of the year working as coordinators, resource teachers, evaluation and testing specialists, curriculum designers, and teaching specialists for given parts of the curriculum. This allows for more variety and challenge and gives each staff member experience with and an understanding of how each component of the system works.

2. What kinds of in-service training are needed?

   A 3-5 day inservice program has been the primary ingredient in starting this program in other locations. Most of the necessary skills required to begin the program can be learned during this training period. This includes management skills, computer operations, familiarization with materials, etc.

3. What kinds of new interactions/cooperative efforts/sharing were needed to implement the instructional system?

   Conceptually, this program is similar to the way good elementary teachers have organized their own classes by re-grouping a class into several sub- groups. Each sub-group was generally formed around a specific or limited set of tasks.

   What is different in this organization is the system has been expanded to include other teachers and other kids. In effect, the walls dividing classrooms have figuratively been removed for the purpose of defining who is in an instructional group.

4. Challenges

   This model departs dramatically from the time-honored patterns of whole-group/age-graded and whole-group/ability-grouped delivery in which the focus of instruction is governed by the capacity of the class to move at a given pace. It also departs from a central feature of these models which is that teachers are accustomed to working alone with a fixed group of students for an entire year.

   Thus, this model may be met with skepticism by those reluctant to depart from traditional models of teacher/student assignment and teacher autonomy. It is a good idea to try sell the four "benefits" listed above as good reasons to try implementation. The achievement results speak for themselves.

For additional information on the Center School's Outcome-Based Instructional System, contact Stephen E. Rubin, Assistant Superintendent for Instruction, 156 South Street, New Canaan, CT 06840.

A Teacher's Comments

"Math? What do you mean I'll be teaching math? I'm a language arts specialist!" With nagging ghosts of my own childhood math failures lurking in my mind, I listened apprehensively to a description of the Center School Math Program.

Using more powers of concentration than I had used in a long time, I began to make sense of all the details which make this program run so well. Though the profile reminded me of a DNA molecule, I found that I could soon use it quickly to graphically chart a child's progress in mathematics and to identify possible next tasks. Short teacher comments and grades were added to the profile sheet and were filled out when the student was ready to test on a particular terminal objective or unit of work. By the end of a marking period, these added up to an impressive "track record" of each student's progress, objectives mastered, test scores, daily work, behavior, effort, and homework. This information was essential since students spent time with different teachers during the report period and the homeroom teacher was likely to be the one to explain the child's math progress to parents at periodic conferences.

As a math teacher, I soon got through the worry of paperwork and procedures and began to appreciate the beauty of the system.

The terminal objectives I taught were likely to change a few times during the year, but for the time I was working with a specific set of units (for instance, division of fractions), I became the school specialist in that area. Other teachers preferred not to "specialize" in a particular area of math and they became "generalists" in the program,

working for brief periods of time at a number of different objectives. By the time I had finished choosing and organizing materials for my class, I had thoroughly reviewed the concept and objective myself. I may have come across several methods and text materials for teaching the same concept, which could come in handy if I had a student who had trouble understanding my initial approach.

Since I gained security by this organized and highly structured approach and I felt I had command of the subject, I could turn my attention away from the books and papers, and to the students. Since I had only the one major preparation, I could use my time to react more conscientiously to the children's work.

I also had the freedom to teach my terminals in a variety of ways. I could do a whole class or small group board lesson if it seemed appropriate; I could give a presentation; I could have students working individually or in small groups; I could have students play a math game or do some other concept-enriching activity; I could have several of these activities occurring simultaneously, meeting a variety of needs at the same time; I could tailor the class to accommodate a bright fourth grader or a slower sixth grader who were doing the same work; I could manage to "touch base" many times per class with a student who needed a lot of attention.

The most enjoyable and enriching time of all for me was when I could work one-on-one with a student while others were occupied as they worked together sharing a similar task or instructional objective. Somehow, that five minutes of my undivided attention seemed to clear up confusions and misconceptions that three or four class or group lessons couldn't! I believe that a child must feel comfortable and cared for to be able to put forth his best academic effort. A few minutes of close contact, heads together over the paper, seemed to create a feeling of mutual concern and acceptance that made the rest of the period go much more smoothly. Since the students knew I cared about what they were doing individually, it was easier for them to care about their own progress--an essential element to this program's success.

Another benefit of this system is the feeling of cohesion among the staff members since all teachers are a part of the same system rather than being artificially divided into grades and/or ability tracks. Teachers freely shared materials and ideas with each other. If my terminals were changed, I would go to other teachers who had taught the same units in years past. They would gladly share packets, masters, and enrichment materials with me, as well as strategies for classroom management. There was also a resource area where instructional materials were coded to the objectives in the program and were available for teacher use.

In addition to all the formal means of communication, teachers, on a day-to-day basis, would meet in the hall and say, "You'll be getting two of my students for division of fractions tomorrow. Student A is very motivated, but makes careless errors. Student B responds well to a little TLC." These comments alerted me to new students' needs so I could begin to respond to them right away.

Each staff member knew that the success of the system depended on our individual effort and our cooperation. The system was extremely flexible, so that if a problem arose, it could be solved right away. Everyone worked towards making things run as smoothly as possible.

While at first glance, the math program may look complicated and mechanical because of its unifying structure and inherent organization, I was freed to interact more with people. Math has helped our faculty learn to rely on each other and to cooperate.

During my actual math classes, I don't really feel that I'm teaching math, as much as I'm teaching kids.

Elaine Halas, Center School

JOHNSON CITY CENTRAL SCHOOL DISTRICT
JOHNSON CITY, NEW YORK

Johnson City School District has a K-12 program with 2700 students and 170 professional staff members. There are two K-5 elementary schools with 550 to 600 students in each of these schools, one middle school with 650 students, and one 9-12 high school with 950 students. Johnson City School District has been involved in Mastery Learning at the K-6 level for the past 12 years and at the 7-12 level for the past ten years. The community of Johnson City's population is made up of 25% retirees, and is basically a blue collar community. The community is considered a low to middle socio-economic community.

Overview

Johnson City has a K-12 Outcome-Based/Mastery Learning program that includes all areas of the curriculum and all personnel. The program uses an instructional process that is based on the present state of the research. All staff development within the district is geared toward the enhancement and sophistication of this instructional process. The differences in beliefs between this system and a traditional one are listed in Table 1.

Operation of the System

1. Planning

   a. Setting objectives for units of instruction.

      Teams of teachers at all levels meet with coordinators and principals to develop objectives for units by grade level and discipline. Each unit is then taught and annotated and revised. This process is outlined in Table 2 on a continuing basis.

   b. How are classes formed? What grouping arrangements are used?

      All groups are formed according to the performance of students within the prescribed curriculum. Daily needs groups are formed by teams of teachers. These groups are fluid and are continually shifted and adjusted according to the achievement of students against a prescribed objective(s).

   c. How are the staff assignments made?

      Assignment of staff is based on student needs. In the Johnson City district 90% of the staff are teamed either by grade level or by discipline. Teachers volunteer to be on a team and teaming does enhance and support the school practices discussed earlier.

TABLE 1
DESCRIPTION OF PREVALENT BELIEFS

Traditional	Johnson City Central School District
1. Natural Selection Theory	1. Talent Can Be Developed
2. Excellence For A Few	2. Excellence For All
3. Remediation Programs	3. Prevention - Continuous
4. Pessimistic About Learning	4. Optimistic About Learning
5. Competitive Learning	5. Cooperative Learning
6. Exclusive Programs	6. Inclusive Programs
7. Mystery Learning	7. Mastery Learning
8. Fear	8. Trust
9. Failure	9. Success
10. "Killer" Phrases	10. Validation Phrases

TABLE 2
INSTRUCTION

PHASE I

1. Assess the necessary prerequisite skills.
2. Review, re-teach, or teach those prerequisites which have not been learned.
3. Consider the feelings of students who were unsuccessful in previous learning encounters in your discipline, understanding that previous failure may cause fear of further failure.
4. Motivate each unit so that students will see the need to study it.

PHASE II

5. Provide for cue-setting.
6. Initiate "best shot" instruction.
7. Involve students actively in the learning process.
8. Provide guided practice.
9. Assess "formatively" for mastery.
10. Provide correctives or enrichment.

PHASE III

11. Assess student performance "summatively."
12. Award credit and grades for individual student progress and success on criterion-referenced items.
13. Allow students to demonstrate new levels of performance on a given set of objectives and alter the grade to reflect such performance.

2. Evaluating mastery

Mastery is evaluated on an on-going basis using many kinds of formative assessments. These assessments may be written or verbal, formal or informal. The assessments are done by students during the course of a unit of learning. Teachers, aides, cooperative student groups, volunteers, and others may be involved in the asssessment at the end of the unit. Learning is certified as students complete a summative assessment.

3. Prescribing correctives, use of gap time, "moving on" to new objectives.

Students are formatively assessed during a unit (one to two weeks) against a set of predetermined objectives. Those students performing below standard are provided with additional corrective time. Those students who perform at predetermined standards may opt to get involved in enrichment and exceptional learning experiences. Students who fail to achieve at the predetermined standard receive an incomplete mark until tasks are achieved. Heavy emphasis is placed on using alternative approaches when providing correctives and enrichment activities.

4. Recordkeeping

Recordkeeping is done by individual teachers or by teacher teams. Documentation shows mastery of specific objectives and student performance. Through a continuous progress curriculum, records show performance on both formative and summative tests. Records also show if students are involved in correctives or enrichment work. Presently, the district is exploring ways in which the computer can assist teachers with recordkeeping.

Results

Student performance on the California Achievement Test given over the past five years shows a significant increase in student learning. Data show that the longer the students remain in the program, the better the learning. Additionally, the number of New York State SAT scholarship winners in the district has increased tremendously over the past ten years. Since 1972, we have gone from seven scholarship winners to upwards of 30 to 40 scholarship winners. The enthusiasm for the program as seen by the community has been overwhelming. Every two years the district gives an anonymous parent survey to parents of students grades K-6. Following are some of the questions and responses:

1. Do you have an understanding of how the teachers are working with your youngster? 98.1% of the parents said they did.

2. Do you feel that you need more explanation on any aspect of the educational program? 95.8% said, "no."

3. Were you invited to visit your school last year? 96.1% said, "yes."

4. From what you have observed, heard, or read, do you feel that the district is moving in a proper direction in its efforts to personalize program? 92.7% said, "yes."

With reference to enthusiasm of the staff, it should be noted that Johnson City has hosted four national conferences on Mastery Learning/Outcome-Based Instruction. Each of these conferences have been well attended with approximately 125-180 participants and has been held solely within the district. In putting on these conferences, approximately 50-60% of the Johnson City staff actually instructed participants in the process. Participants also observed teachers in the classroom. Over the past three years, approximately 30 staff members served as consultants to other districts. Finally, over the past three years, we have had 1,500 to 2,000 visitors come to Johnson City to observe our Mastery Learning/Outcome-Based program.

Implications for Implementation

1. Benefits of this system

- Improved student learning;
- Reduction in discipline problems;
- Reduction in vandalism;
- Improved student attitude;
- Professional self-esteem.

2. Problems and difficulties

   a. Getting started

      - Developing a sense of mission;
      - Establishing common beliefs for making decisions;
      - Starting too large and moving too quickly;
      - Not managing the change factors;
      - Not having a readily accessible problem-solving process.

   b. Keeping it up

      - Provide release time for teachers to plan unit guides;
      - Providing each teacher-team with a common planning time;
      - Must keep recordkeeping simple;
      - Ongoing student/teacher interaction reduces the need for massive record keeping systems.

3. What kinds of in-service training are needed?

   - Development of in-house core facilitators, preferably one that includes a central office person, a building principal, and several teachers;
   - Opportunities for staff to gather and discuss beliefs and practices;
   - Planning and instruction based on the best research available;
   - Development of a problem identification and solving process;
   - Opportunities for staff to get involved in renewal activities.

4. What kinds of new interactions/cooperative efforts/sharing were needed to implement the instructional system?

   There should be a co-relationship between teachers and administrators whereby each are co-doers, co-learners, and co-problem solvers. Primacy of expertise and knowledge is the basis for influence in the district and not position. The relationship between teachers and students becomes a cooperative one which says to the student, "Don't worry, I'll help you."

5. Advice

   - Set up and maintain a good communication network within and outside the schools;
   - Constantly renew the philosophy, the practices, and the ideas that were agreed on;
   - Agree on problem-solving process and use it;
   - Stick to the basics and make sure that practices reflect the belief system;
   - Make decisions against the best research and put people in conflict with the research and not with each other;
   - Build a strong sense of trust within the district.

6. Challenges

   - Maintaining excellence in teaching the essentials day-to-day;
   - Continually managing the change process;
   - Expanding the process to help gifted and talented students;
   - Keeping staff on the cutting edge and always growing, and sophisticating the process;
   - Adhering to the beliefs.

For additional information on the Johnson City Central School District's Outcome-Based Instructional System, contact Lawrence A. Rowe, Assistant Superintendent for Instruction, K-12, 666 Reynolds Road, Johnson City, NY 13790.

A Teacher's Comments

Since I became involved in our instructional process, many of the frustrations I found as a teacher vanished. The more involved and sophisticated I become in the process, the more students learn and the happier we both are about our success.

When I was first introduced to this process, my initial reaction was, "I do all those things. What's so different?" The difference was I was sporadic rather than systematic in my approach. My teaching was far from a conscious, thought-out process that enabled most students to learn and learn well.

As I analyzed the process and compared it to my "methods" in reality, I found many differences:

1. I had no preteaching stage. In the back of my mind, I knew there were certain skills students had to know in order to start a unit, but I never bothered to assess or remediate any deficiences, therefore ensuring failure of some from day one.

2. I never told students what they would learn or why.

3. I never altered the learning time from one student to another.

4. I never consciously decided on the best modes of initial instruction nor thought about the type of objective I was about to teach (information, concept, process).

5. I was not an active participant during the guided practice stage to certify those who were doing well or to form needs groups with those having difficulties.

6. I did not assign independent practice to only those who demonstrated they could do the work.

7. I continuously assessed, but for a grade rather than for diagnostic purposes.

8. I did provide correctives and enrichment but not on a needs basis. It was to all or none.

9. My unit tests were not directly aligned with what I had taught. Many times I asked students to go into higher levels of thinking when, in fact, I had never taught them to do this.

10. I did not certify only those students who demonstrated mastery but certified many for time spent rather than performance.

11. I did not provide reteaching, correctives, and retesting for those who did not master, but rather took them on to the next unit. In the areas of continuous progress this surely meant failure.

12. I did not use the final test as the only grade to measure how well a student learned.

I do not look back without regret. Educationally, I didn't like where I was. With my present knowledge of the instructional process and my quest to learn more about effective teaching and the way students learn best, I look at the present and to the future with much enthusiasm.

A Principal's View

A principal's role in a unique system such as Johnson City offers special challenges and rewards. Though tight, efficient program management is essential, this management must take minimal time. The principal's major activities in Johnson City force intense daily involvement in all aspects of curriculum and instruction.

Being a principal in Johnson City requires a strong adherence to the system's "mission" or central value. It also requires expertise in Mastery Learning theory and practice and change management, as well as the latest research-based information on "leadership excellence." One cannot operate from the power of one's position and make things really happen. In Johnson City, a principals' meeting or administrative council meeting would find a team of colleagues working together with position de-emphasized.

Great attention is paid to establishing and maintaining effective communications practices. In any given week, the principal would not only meet formally with each team in a school but also informally communicate what is happening to all staff members. A typical week would see a Johnson City principal practicing MBWA, "management by walking around," by being there where the action and problems are.

Though there is daily involvement in discipline, correspondence, and other everyday management matters, an observer for a week who would follow a Johnson City principal would see a learner, a listener, a teacher, a team worker, and a person who fully understands that his influence will make an essential difference between a good school that stands for excellence.

RED BANK BOROUGH SCHOOL DISTRICT
RED BANK, NEW JERSEY

Red Bank Borough has 1,000 pupils from lower and middle class families. It has approximately 65 percent minority population. Red bank has been involved in Mastery Learning for five years.

Overview

All curricula are based upon objectives and units which have been developed to teach those objectives. Objectives are taken from a study of standardized tests, community input, and staff input. All personnel and all subject areas are involved.

Operation of the System

1. Planning

   a. Setting objectives for units of instruction.

      Teachers establish objectives during released time meetings. Objectives are listed in curriculum guides and revised every year or two by a curriculum committee established across grades for this purpose. Units based upon objectives are developed on a grade-by-grade basis.

   b. How are classes formed? What grouping arrangements are used?

      Classes are completely heterogeneous. An attempt is made to balance sex, race, ability, and behavior so that classes on a grade level are as similar as we can make them. Grouping takes place only after the formative test, at which time children are placed in corrective group or extension group for further work.

   c. How are the staff assignments made?

      Staff assignments are based primarily upon teacher desire.

2. Evaluating mastery

   Each unit, i.e., each objective, has a mastery test which is administered by the teacher. It is a teacher-made document. The same mastery test is used by all teachers teaching the objective. Results are compared with standardized test items having the same specifications. Significant discrepancies in results between local tests and standardized tests require diagnostic review of causes and possible revision of curriculum.

3. Prescribing correctives, use of gap time, "moving on" to new objectives.

   There are at least six correctives for each objective using a variety of approaches and modalities. Recycled instruction is required to differ from initial instruction. Objectives are calendared for the year. Teachers follow the calendar within a day or two of each other. At the end of the time established for the objective, the mastery test is given to all pupils, then the class moves on to the next objective. One or two children who may have done poorly are given additional time using Chapter I personnel.

4. Recordkeeping

Records of formative tests and mastery tests are kept by the teacher who sends a copy to the principal. Some teachers are beginning to use computer recordkeeping.

Results

Results show a significant gain in test scores on all grade levels from the 1978-79 school year before Mastery Learning was implemented to the 1983 school year. For example, in the eighth grade math went from 8.0 to 11.6; language, from 7.6 to 10.6; reading, from 7.3 to 10.0; science, from 7.6 to 9.1; and social studies, from 7.3 to 9.4.

Staff has become very supportive of the program, is proud of working in the district and of the results achieved. Student behavior has improved. The community is most supportive.

Implications for Implementation

1. Benefits of the system

- More task orientation;
- More pupil and teacher time-on-task;
- Improved test results, which reflect improved capabilities of youngsters;
- Improved pupil self-image, which results in better behavior.

2. Problems and difficulties

Some parents are loathe to give up homogeneous grouping. Many staff members did not like to change the way they had been doing things until it was proven to them that Mastery Learning works. Extensive in-service is necessary. Developing each unit takes a lot of time, although it virtually eliminates the necessity for the weekly lesson plan books that were done in the past. Time is needed to work on units that require revision or the new units. However, once the unit has been revised, it can be used by all teachers for a couple of years.

3. What kinds of in-service training are needed?

- How to develop formative tests;
- How to develop mastery tests;
- How to develop corective materials;
- How to develop extension materials;
- How to incorporate the higher levels of Bloom's Taxonomy in the objectives;
- How to use the different strategies required to teach a concept vs. a skill vs. information;
- How to monitor time-on-task;
- How to write a high quality objective and to recognize what level it is on Bloom's Taxonomy;
- How to write a high quality unit to each objective;
- How to effect time-on-task;
- How to choose materials that reflect the objective rather than going through a textbook series;
- Parent in-service so they understand the change.

OFFICE OF THE SUPERINTENDENT

RED BANK PUBLIC SCHOOLS
RED BANK, NEW JERSEY

MAT Spring

Area	Grade 8 - Norm 8.8					Grade 7 - Norm 7.8					Grade 6 - Norm 6.8					Grade 5 - Norm 5.8				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
Basic Skills		8.8	9.4	9.6	10.2		8.1	8.5	7.6	8.4		7.2	7.2	7.9	7.7		6.1	6.5	6.0	6.3
Math	6.0	9.0	10.4	9.6	11.6	7.6	9.2	8.7	7.7	9.4	6.4	7.4	7.5	8.1	7.5	5.3	6.1	6.5	6.2	6.2
Language	7.4	8.9	9.3	9.5	10.1	7.8	7.6	8.1	7.6	7.9	6.2	7.1	7.1	8.3	7.9	5.3	6.1	6.1	6.3	6.3
Reading	7.3	8.9	9.4	9.6	10.0	7.1	7.5	8.6	8.1	8.5	6.0	7.0	7.2	7.8	8.1	5.0	5.8	6.5	5.5	6.3
Complete Battery		8.5	9.1	9.1	9.5		7.8	8.2	7.5	8.1		6.8	7.0	7.3	7.2		6.0	6.1	5.9	5.9
Science	7.6	8.5	9.0	8.9	9.1	7.1	7.5	7.8	7.2	7.9	6.2	7.2	7.4	7.3	7.2	5.1	6.3	5.8	5.9	5.6
Social Studies	7.3	8.7	9.3	9.2	9.4	6.8	8.3	8.7	8.0	7.9	6.2	6.6	6.9	7.2	7.1	5.3	6.0	6.0	5.9	5.8

Area	Grade 4 - Norm 4.8					Grade 3 - Norm 3.8					Grade 2 - Norm 2.8					Grade 1 - Norm 1.8				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
Basic Skills		5.0	5.3	5.0	5.9		4.0	4.1	5.0	5.0		2.8	3.1	3.3	3.8		1.7	1.9	2.2	2.2
Math	4.8	5.5	5.4	5.1	6.0	4.0	4.5	4.5	5.1	5.7	2.9	3.2	3.5	3.2	4.1	1.8	2.0	2.0	2.3	2.4
Language	4.8	5.2	5.5	5.7	6.6	4.1	4.2	4.3	5.1	5.9		2.9	3.3	3.6	4.1		1.6	2.0	2.4	2.4
Reading	4.2	4.0	4.4	4.3	4.8	3.5	3.3	3.5	3.4	3.6	2.6	2.5	2.8	3.2	3.4	1.9	1.7	1.9	2.1	2.1
Complete Battery		4.5	4.8	4.7	5.6		3.7	3.7	4.4	4.3		2.7	3.0	3.3	3.7		1.5	1.7	2.1	2.1
Science		4.3	4.7	4.7	6.2		3.6	3.6	3.9	3.9		2.8	3.1	3.1	4.1		1.9	1.9	2.4	2.4
Social Studies		4.2	4.7	4.8	5.7		3.3	3.4	4.1	3.8		2.3	2.5	3.0	3.2		1.7	1.9	2.2	2.2

4. What kinds of new interactions/cooperative efforts/sharing were needed to implement the instructional system?

   Because it is more efficient for one unit to be used by all teachers, staff members had to learn to share ideas and materials with each other. This has been a plus because there has been more dialoguing than ever before.

5. Advice

   During the first year, implement the use of formative tests, correctives, extensions, and mastery tests using traditional materials. During the second year, begin to elaborate as above.

6. Challenges

   The major challenge is turning an innovation into standard operating procedure. This must be done through modifications to job descriptions, assignment of responsibility to specific staff members, recognition of positive teacher effort, changes in how one reports out to parents, modification of plan books, administrative in-service, and development of monitoring devices.

For additional information on the Red Bank Borough's Outcome-Based Instructional System, contact Joan D. Abrams, Superintendent, 76 Branch Avenue, Red Bank, NJ 07701.

Principal's Week

MONDAY -
- Observation conference with teacher (30 minutes)
- Curriculum meeting with grades 3 and 4 (1 hour)
- Observe in classrooms (2 hours)
- Faculty Meeting (1 hour)

TUESDAY -
- Grade level meeting for grades 1 and 2 on objectives (30 minutes)
- Observe in classroom (3 hours)
- Administrative Cabinet meeting (2 hours)

WEDNESDAY -
- Report Card committee meeting (2 hours)
- Observe in classrooms (2 hours)
- P.T.A. Luncheon to honor "Teacher of the Year" (1 hour)
- Individual meetings with staff/follow-up observations (1 hour)

THURSDAY -
- Individual staff meetings (1 hour)
- Meeting with Principal of Middle School (1 hour)
- Talented and Gifted Committee meeting (1 hour)
- Observations in classrooms (1 hour)
- Individual staff meetings regarding objective schedules (1 hour)
- Parent Advisory Committee meeting (p.m., 3 hours)

FRIDAY -
- Early Childhood meetings (1 hour)
- Visit classrooms (2 hours)
- Planning meeting with Program Leader (1 hour)
- Interview for new staff opening (2 hours)

This brief outline does not include emergency and planned parent conferences, meetings with the Child Study Team, discipline conferences with children and parents, routine office and paper work and the many other items that have a tendency to "round out" my day.

Teacher's Week

MONDAY -
Pre-class planning (20 minutes)
Instruction/curriculum (3 hours and 15 mintues)
TAG program
Basic Skills - criteria/pupils
Lunch (35 minutes)
Special Areas/Professional Planning Time (40 minutes)
D.E.A.R Time (silent-sustained reading) (20 minutes)
Instruction/curriculum (1 hour)
Faculty meeting (50 minutes)
Recordkeeping, preparation, grading papers, etc. (2 hours)

TUESDAY -
Pre-class planning (20 minutes)
Instruction/curriculum (3 hours and 15 mintues)
TAG program and Basic Skills instruction, within or pull-out (30 minutes)
Lunch (35 minutes)
Special Areas/Professional Planning Time (40 minutes)
D.E.A.R Time (silent-sustained reading) (20 minutes)
Instruction/Film (1 hour)
Grade level meeting (45 minutes)
Recordkeeping (2 hours)

WEDNESDAY -
Pre-class planning (20 minutes)
Curriculum Workshop meeting (1/2 day)
Supertooth dental program (10 minutes)
Book selection (20 minutes)
Instruction/curriculum (3 hours and 15 minutes)
Lunch (35 minutes)
Special Areas/Professional Planning Time (40 minutes)
D.E.A.R Time (silent-sustained reading) (20 minutes)
Instruction/curriculum: Social Studies Projects (1 hour)
Bus duty (10 minutes)
Recordkeeping (2 hours)
Grading papers (2 hours)

THURSDAY -
Pre-instructional planning (20 minutes)
Assembly (30 minutes)
Instruction/curriculum (2 hours and 45 minutes)
Lunch (35 minutes)
Special Areas/Professional Planning Time (40 minutes)
D.E.A.R Time (20 minutes)
Instruction/curriculum: Science Projects (1 hour)
Bus duty (10 minutes)
Recordkeeping (2 hours)
Grading papers (2 hours)

FRIDAY -
Pre-instructional planning (20 minutes)
Instruction/curriculum (3 hours and 15 minutes)
Lunch (35 minutes)
Special Areas/Professional Planning Time (40 minutes)
D.E.A.R Time (20 minutes)
Instruction/curriculum: Health (1 hour)
Bus duty (10 minutes)
Grade level meeting (30 minutes)

The Improvement Support Program at Far West Laboratory provides a variety of educational services to educators in Northern California, Utah, and Nevada including research information, technical assistance, and staff development.

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